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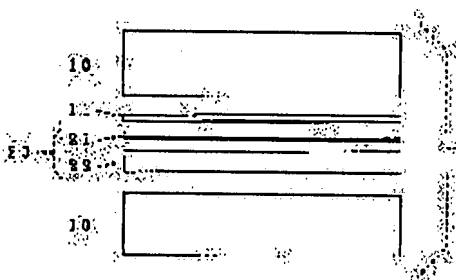
## (54) INTERMEDIATE FILM FOR SANDWICH GLASS AND SANDWICH GLASS

(57)Abstract:

PURPOSE: To obtain highly functional sandwich glass having excellent penetration resistance and glass splashing preventives over a long period and high functional characteristics, such as reflectivity of heat ray by forming a film having specific constitution as an intermediate film of a transparent plate formed with a metal oxide layer or metallic layer on its inside surface side and a glass plate.

CONSTITUTION: The sandwich glass 30 is constituted by inserting the intermediate film 20 for the sandwich glass between the transparent plate 10+11 formed with the metal oxide layer or metallic layer 11 on at least its inside surface side and the glass plate 10. The intermediate film 20 is composed of a base layer 22 formed of a resin compsn. consisting of a polyvinyl acetal resin of an acetalization rate of 60 to 75mol%, a plasticizer, carboxylic acid metallic salt and dicarboxylic acid compd. and an adhesive power adjusting layer 21

formed of a resin compsn. consisting essentially of a polyvinyl acetal resin contg. a



plasticizer and having an acetalization rate of 80 to 95mol%. The metal oxide layer or the metallic layer 11 side is provided with the adhesive power adjusting layer 21.

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#### DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Industrial Application] Especially this invention is excellent in penetration-proof and the scattering tightness of glass, and relates to the interlayer for glass laminates and glass laminate which are used for the glass laminate which has the high efficiency of heat ray reflexivity.

[0002]

[Description of the Prior Art] The glass laminate is widely used for the object for construction, and the windshields of an automobile from before. There are some which \*\*\*\* the interlayer which consists of a plasticized polyvinyl-acetal resin constituent as a typical thing of this glass laminate between the glass plates of a pair, and stuck it. If an impact is added from the exterior, a square will damage such a glass laminate, but the interlayer infixed between glass is not damaged easily, and since damaged glass is in the condition stuck on the interlayer, it is rare for the glass fragment to disperse. Therefore, it can prevent that human being in transportation or a building receives a trauma with the fragment of glass.

[0003] In order to satisfy the function as such safety glass, it is necessary to adjust the adhesive strength between an interlayer and glass to a certain within the limits. That is, it is because glass separates and disperses from the film by the impact from the outside in the glass laminate whose adhesive strength of a glass plate and an interlayer is too small, and glass and the film are beaten by both the glass laminates whose adhesive strength of a glass plate and an interlayer is too large conversely and it penetrates by the impact from the outside with them.

[0004] In order to adjust the adhesive strength of a glass plate and an interlayer, the approach of scouring an adhesive strength regulator (called the increment agent in impact strength) to an interlayer, and making it contain it, or making it usually adhere to a front face is adopted. Of course, the moisture content in an interlayer is also adjusted.

[0005] Generally as an adhesive strength regulator, the alkali-metal salt of a carboxylic acid or the alkaline-earth-metal salt, the denaturation silicone oil, etc. are used (for example, refer to JP,45-32071,B and JP,55-29950,B).

[0006] By the way, the layer which has high efficiency is prepared in the inside side of a glass plate, and the glass laminate which gave high efficiency, such as selection beam-of-light permeability and transparency conductivity, is proposed in recent years. For example, it is heat reflective glass, dew condensation prevention conductive glass, etc., and these special glass laminates are beginning to be used for a building, an automobile, etc. These properties are acquired by mainly forming in a glass front face by the thin film and vacuum deposition method of highly efficient nature, the sputtering method, etc.

[0007] As a configuration of the layer which has high efficiency, structural heat reflective glass has many which were constituted by preparing a metal oxide layer (heat ray reflecting layer) in a glass medial surface, for example. Moreover, there is much what consisted of heat reflective glass for automobiles by preparing the layer (heat ray reflecting layer) which put metal layers, such as silver, between the medial surface of a glass plate by the metal oxide layer.

[0008] The glass laminate using these metal oxide layer or a metal layer (heat ray reflecting layer) is mainly a configuration of a glass plate / heat ray reflective sheet / interlayer / glass plate, and a glass plate / interlayer / heat ray reflective sheet / interlayer / glass plate, and the highly efficient layer prepared in the glass plate or the sheet is arranged inside the glass laminate, in order to protect it. So, a metal oxide layer or a metal layer, and an interlayer will contact.

[0009]

[Problem(s) to be Solved by the Invention] Also in the glass laminate which has such a metal oxide layer or a metal layer, advanced penetration-proof and the scattering tightness of glass are demanded, and in order to give these engine performance, it is necessary to adjust the adhesive strength of a metal oxide layer or a metal layer, and an interlayer to altitude.

[0010] However, unlike the usual glass laminate without a metal oxide layer or a metal layer, it passed by the outdoor exposure or UV irradiation, the adhesive strength between both tended to decline by the time, and the thing which scoured to the interlayer the adhesive strength regulator which consists of a carboxylic-acid metal salt, or was made to adhere to a front face had the trouble that a glass plate became easy to exfoliate from an interlayer by the impact.

[0011] Moreover, aging of adhesive strength became large with temperature, and some which scoured to the interlayer the adhesive strength regulator which consists of a denaturation silicone oil had the trouble that a glass plate became easy to exfoliate from an interlayer by an impact etc., although aging by the outdoor exposure or UV irradiation was small.

[0012] A denaturation silicone oil is a liquid, and this adhesive strength fall is considered for carrying out bleed out to the interface of a metal oxide layer or a metal layer, and an interlayer gradually in order not to dissolve completely with resin and a plasticizer.

[0013] In addition, the thing to which the adhesive strength regulator which consists of a

denaturation silicone oil was made to adhere on the surface of an interlayer with the heat ray reflector and glass plate side (a metal oxide layer or metal layer), and the remarkable difference arose in the adhesive strength of an interlayer and a glass plate, and it had the trouble that penetration-proof worsened.

[0014] This invention persons by using the interlayer for glass laminates which has a specific configuration for transparence plates with which the metal oxide layer or the metal layer was formed in the inside side at least, such as heat reflective glass, as a result of repeating research wholeheartedly that the above-mentioned trouble should be solved. It came to complete a header and this invention for the ability of the glass laminate which passes with an outdoor exposure, UV irradiation, and temperature, does not almost have the fall of adhesive strength at the time, and is excellent in penetration-proof and the scattering tightness of glass to be manufactured.

[0015] It passes through the purpose of this invention with an outdoor exposure, UV irradiation, and temperature, it does not almost have the fall of adhesive strength at the time, is excellent in penetration-proof and the scattering tightness of glass, and offers the interlayer for glass laminates and glass laminate which are used for the glass which has highly efficient nature, such as heat ray reflexivity.

[0016]

[Means for Solving the Problem] Namely, this invention is an interlayer for glass laminates fastened between the transparence plates and glass plates with which the metal oxide layer or the metal layer was formed in the inside side at least. The substratum formed from the resin constituent with which the degree of acetalization consists of the polyvinyl-acetal resin in 60-75-mol the range which is %, a plasticizer, a carboxylic-acid metal salt, and a dicarboxylic acid compound, It consists of adhesive strength adjustment layers formed from the resin constituent which uses as a principal component the polyvinyl-acetal resin which has the degree of acetalization in 80-95-mol the range in which it is %. The interlayer for glass laminates characterized by preparing this adhesive strength adjustment layer in the near field where the above-mentioned metal oxide layer or a metal layer exists is offered.

[0017] Moreover, this invention is an interlayer for glass laminates fastened between the transparence plates and glass plates with which the metal oxide layer or the metal layer was formed in the inside side at least. The substratum formed from the resin constituent with which the degree of acetalization consists of the polyvinyl-acetal resin in 60-75-mol the range which is %, a plasticizer, a denaturation silicone oil, a carboxylic-acid metal salt, and a dicarboxylic acid compound, It consists of adhesive strength adjustment layers formed from the resin constituent which uses as a principal component the polyvinyl-acetal resin which has the degree of acetalization in 80-95-mol the range in which it is %. The interlayer for glass laminates characterized by preparing this adhesive strength adjustment layer in the near field where the above-mentioned metal oxide layer or a metal layer exists is offered.

[0018] Furthermore, the glass laminate characterized by having pasted up this invention so that the adhesive strength adjustment layer by which the above-mentioned interlayer for glass laminates is formed from the resin constituent which uses as a principal component the polyvinyl-acetal resin which the degree of acetalization has in 80-95-mol

the range in which it is % between a glass plate and the transparency plate with which the metal oxide layer or the metal layer was formed in the inside side may contact an above-mentioned metal oxide layer or metal layer side is offered.

[0019] Hereafter, the configuration of this invention is explained in full detail. The substratum of the interlayer for glass laminates used for this invention is formed from the plasticization polyvinyl-acetal resin which makes the polyvinyl-acetal resin which has the degree of acetalization in 60-75-mol the range in which it is % come to contain a plasticizer, a carboxylic-acid metal salt, and a dicarboxylic acid compound. Furthermore, even if it makes a denaturation silicone oil contain, the purpose of this invention is reached.

[0020] The resin of a class with which this polyvinyl-acetal resin is conventionally used for the interlayer of a glass laminate, for example, the resin which acetalized polyvinyl alcohol by the aldehyde of carbon numbers 4-10, is used.

[0021] Bad [ when the degree of acetalization of the above-mentioned polyvinyl-acetal resin is lower than 60 mol % / compatibility with a plasticizer ], when the degree of acetalization of resin is higher than 75-mol %, it falls, various engine performance, for example, penetration-proof, at the time of making it a glass laminate.

[0022] As polyvinyl alcohol used for producing the above-mentioned polyvinyl-acetal resin, the thing of average degree of polymerization 800-3000 is desirable. If the penetration-proof of a glass laminate is inferior in average degree of polymerization being less than 800 and average degree of polymerization exceeds 3000, reinforcement will be too large and it will not usually be used as safety glass.

[0023] Moreover, if , in order to close transparency, thermal resistance, and lightfastness, as for whenever [ saponification / of polyvinyl alcohol ], it is desirable that it is more than 95 mol %.

[0024] As for the plasticizer blended with the above-mentioned polyvinyl acetal, phosphoric-acid system plasticizers, such as organic system plasticizers, such as monobasic-acid ester and polybasic acid ester, and an organic phosphorus acid system, an organic phosphorous acid system, are used. In monobasic-acid ester, the glycol system ester obtained by the reaction with organic acids, such as triethylene glycol, butanoic acid and an isobutyric acid, a caproic acid, 2-ethyl butanoic acid, oenanthic acid, n-octylic acid, a 2-ethylhexyl acid, a PERASUGON acid (n-nonylic acid), and a DESHIRU acid, etc. is desirable. In addition, the ester of tetraethylene glycol, tripropylene glycol, and the organic acid like the above is also used.

[0025] As ester of polybasic acid, the shape of a straight chain of organic acids, such as an adipic acid, sebacic acid, and an azelaic acid, and carbon numbers 4-8 and ester with the letter alcohol of branching are desirable.

[0026] Moreover, as a phosphoric-acid system plasticizer, tributoxyethyl phosphate, isodecyl phenyl phosphate, triisopropyl phosphite, etc. are desirable.

[0027] As a more desirable example, triethylene glycol di-2-ethyl butyrate, triethylene glycol G 2-ethylhexoate, triethylene glycol JIKAPURONETO, triethylene glycol G n-octoate, etc. are mentioned with monobasic-acid ester.

[0028] As for such a plasticizer, 5 - 80 weight section is suitably mixed to the resin 100 weight section. When penetration-proof may fall when a plasticizer content is under 5

weight sections, and 80 weight sections are exceeded conversely, a plasticizer may carry out bleed out and an adhesive property with the transparency of a glass laminate, a glass plate, etc. may fall.

[0029] As a carboxylic-acid metal salt used for this invention, the alkali-metal salt or alkaline-earth-metal salt of 12 or less aliphatic series monochrome or dicarboxylic acid is preferably used for a carbon number. Mg, Na, K, etc. are mentioned as a metal component, and an acetic acid, a propionic acid, butanoic acid, a caproic acid, a caprylic acid, an amber acid, an adipic acid, etc. are mentioned as a carboxylic acid.

[0030] As an example of a desirable carboxylic-acid metal salt, although potassium acetate, magnesium acetate, a propionic-acid potassium, propionic-acid magnesium, sodium propionate, caproic-acid magnesium, caproic-acid sodium, 2-ethyl caproic-acid magnesium, 2-ethyl caproic-acid sodium, caprylic-acid magnesium, sodium caprylate, amber acid magnesium, amber acid sodium, etc. are mentioned, magnesium acetate is desirable also in these. <BR> [0031] Moreover, as an addition of a carboxylic-acid metal salt, the 0.001 to 0.1 section is desirable. When the adhesive strength adjustment effectiveness is lost as the addition of a carboxylic-acid metal salt is the less than 0.001 sections, the 0.1 sections were exceeded and it uses for the heat reflective glass which has a metal oxide layer or a metal layer, it is not desirable, in order that it may pass by the outdoor exposure or UV irradiation and the adhesive strength between glass and an interlayer may decline remarkably by the time.

[0032] As a dicarboxylic acid compound used for this invention, aromatic series dicarboxylic acid, such as aliphatic series dicarboxylic acid, such as an amber acid, a glutaric acid, an adipic acid, a pimelic acid, a suberic acid, an AZERAN acid, and a sebacic acid, and a phthalic acid, isophthalic acid, a terephthalic acid, is mentioned.

[0033] It is desirable that it is the range of the 0.001 to 0.1 section, and if the effectiveness of the adhesive strength adjustment by their being the less than 0.001 sections is not acquired and the 0.1 sections are exceeded, in order that the addition may cause the cloudiness of an interlayer, and coloring, it is not desirable.

[0034] As a denaturation silicone oil used for this invention, an ether denaturation silicone oil, an epoxy denaturation silicone oil, an ester denaturation silicone oil, an amine denaturation silicone oil, an alpha-methyl-styrene denaturation silicone oil, an alpha olefin denaturation silicone oil, an alcoholic denaturation silicone oil, a fluorine denaturation silicone oil, a mercapto denaturation silicone oil, carboxyl denaturation silicone oils, those covariance types (for example, ether epoxy denaturation silicone oil), etc. are mentioned.

[0035] These are \*\*\*\*\* liquids which the compound which should generally denaturalize to a polysiloxane is made to react, and are obtained. It is desirable that it is the 0.001 to 0.1 section as an addition of a denaturation silicone oil. In the 0.001 or less sections, since adhesive strength not only declines extremely, but aging of adhesive strength will become large if the moisture resistance of an interlayer falls and the 0.1 sections are exceeded, it is not desirable.

[0036] Moreover, the above-mentioned substratum may be made to contain well-known additives, such as an ultraviolet ray absorbent, light stabilizer, and an antioxidant.

[0037] The substratum of the above-mentioned interlayer for glass laminates can blend

the plasticizer of requirements with polyvinyl-acetal resin, can blend other additives if needed further, and can obtain them by carrying out kneading fusion of this with an extruder, and fabricating in the shape of a sheet. Moreover, it can also press and obtain, after carrying out kneading fusion with a roll.

[0038] Although especially the thickness of the substratum of the above-mentioned interlayer for glass laminates is not limited, in order to hold the penetration-proof which is a property required as an insurance glass laminate, its 0.1-2mm is desirable.

[0039] The adhesive strength adjustment layer used between the above-mentioned substratum, the metal oxide layer of a transparence plate, or a metal layer is formed from the plasticization polyvinyl-acetal resin constituent which made the polyvinyl-acetal resin which has the degree of acetalization in 80-95-mol the range in which it is % contain a plasticizer.

[0040] The resin of the class currently used for the above-mentioned substratum as such polyvinyl-acetal resin, for example, the resin which acetalized polyvinyl alcohol by the aldehyde of carbon numbers 4-10, is used.

[0041] or it compounds as the adjustment approach of the above-mentioned polyvinyl-acetal resin by using 30% of the weight or more of DMSO for a solvent -- or more than 50 mol % -- the approach of compounding the acetalized resin in a nonpolar solvent is used. The adhesive strength of the film and glass has the too strong degree of acetalization less than [ 80 mol % ], and since adhesive strength required since there are few amounts of the hydroxyl group contributed to adhesion when the penetration-proof of a glass laminate falls and 95-mol % is exceeded is not obtained, it is not desirable.

[0042] The polyvinyl alcohol used for the polyvinyl-acetal resin which has the above-mentioned degree of acetalization in 80-95-mol the range in which it is % or the plasticizer kind blended, and the amount of plasticizers are the range of the same class as what was used by said substratum, and an amount.

[0043] Moreover, although especially the thickness of this adhesive strength adjustment layer is not limited, it is usually 0.1-2mm.

[0044] Moreover, an adhesive strength adjustment layer may be made to contain an ultraviolet ray absorbent and/or an antioxidant, and the object of the former [ these ] is used for it.

[0045] In this way, in order to manufacture a glass laminate using the interlayer obtained, it pinches so that the adhesive strength adjustment layer formed from the resin constituent which uses as a principal component the polyvinyl-acetal resin which has the degree of acetalization in 80-95-mol the range in which it is % in an interlayer at a metal oxide layer or metal layer side between a glass plate and the transparence plate with which the metal oxide layer or the metal layer was formed in the inside side may contact.

[0046] Generally as a glass plate, an inorganic or organic transparent glass plate is used by each. Especially if the transparence plate is transparent, it will not be limited, but a usually transparent glass plate is used.

[0047] A metal oxide layer or a metal layer is for giving high efficiency, such as transparence conductivity and heat ray reflexivity, and coats, such as the mixture (ITO)

of indium oxide and tin oxide, tin oxide, a zinc oxide, gold, silver, and copper, are formed for transference conductivity grant. For heat ray reflexivity grant, gold, silver, copper, tin, aluminum, nickel, palladium and these alloys, or the metal coat of mixture is formed.

[0048] These metal oxide layers or a metal layer may be directly formed in the inside side of a transference plate, or once forms the metal oxide layer or the metal layer in the suitable sheet, and may paste up this functional sheet through the suitable glue line (interlayer) for the inside side of a glass plate. In addition, a metal oxide layer or a metal layer may be formed in both sides not only the inside side of a transference plate but by the side of the inside of a transference plate, and external surface.

[0049] Subsequently, equipments, such as an autoclave, are used, and this layered product is heated and pressurized. In this way, a glass laminate is manufactured. In this case, the almost equivalent thing of the adhesive strength of the transference plate and interlayer in which the metal oxide layer or the metal layer was formed, and the adhesive strength of the glass plate and interlayer in which the metal oxide layer or the metal layer is not formed is desirable from the point of penetration-proof.

[0050] When the adhesive strength of the transference plate and interlayer in which the metal oxide layer or the metal layer was formed changes the degree of acetalization, the adhesive strength of the glass plate and interlayer in which the metal oxide layer or the metal layer is not formed can be adjusted again by adjusting the addition of each additive (a carboxylic-acid metallic oxide, a dicarboxylic acid compound, and denaturation silicone oil).

[0051] The decomposition sectional view showing the interlayer for glass laminates of this invention and the typical example of a glass laminate is shown in drawing 1. As for the adhesive strength adjustment layer in which, as for 10, the degree of acetalization is formed from the resin constituent with which, as for a metal oxide layer or a metal layer, and 21, the 80-95-mol polyvinyl-acetal resin it is [ polyvinyl acetal ] % is used as a principal component a glass plate and 11, the substratum formed from the resin constituent with which 22 uses as a principal component the polyvinyl-acetal resin which has the degree of acetalization in 60-75-mol the range in which it is % and 20, in drawing 1, the interlayer for glass laminates and 30 are glass laminates.

[0052]

[Function] According to this invention, highly efficient nature (heat ray reflexivity etc.) is given by a metal oxide layer or the metal layer. By allotting the adhesive strength adjustment layer formed from the resin constituent which uses as a principal component the polyvinyl-acetal resin which has the degree of acetalization in 80-95-mol the range in which it is % to a metal oxide layer or metal layer side Adhesive strength with an interlayer, a metal oxide layer, or a metal layer is adjusted moderately. Again The polyvinyl-acetal resin which has the degree of acetalization in 60-75-mol the range in which it is %, The adhesive strength of a glass side and an interlayer is moderately adjusted by allotting the substratum formed from the resin constituent which consists of a plasticizer, a carboxylic-acid metal salt, and a dicarboxylic acid compound to the glass side with which the metallic oxide or the metal layer is not formed. Furthermore, it also becomes possible by adding a denaturation silicone oil to a substratum to raise the



moisture resistance of an interlayer.

[0053]

[Example] Although an example is given to below and this invention is explained to it in more detail, this invention is not limited to these examples.

[0054] "Example 1"

\*\* Preparation of the adhesive strength adjustment layer of the interlayer for glass laminates (degree-of-acetalization % [ % of 85 mols ] polyvinyl-acetal film)  
60g of degree-of-acetalization 65-mol % of polyvinyl butyral resin was dissolved in xylene 1768g at 25 degrees C 99.2% a degree of polymerization 1700 and whenever [ saponification ]. Then, n-butyraldehyde 95g was enough mixed by stirring for about 5 minutes after the package injection. Addition mixing of the 15g of the solution of hydrochloric acid was carried out with the dropping funnel over about 15 minutes 35% after that. since addition mixing of these is carried out -- after about 30 minutes and the whole system -- 60 degrees C -- a temperature up -- carrying out -- 3 hours -- constant temperature -- it holds and a reaction is made to complete It neutralizes by adding the water/methanol of an overlarge (mixing ratio 1:1) made to dissolve sodium bicarbonate in what carried out the completion of a reaction. Then, this is dropped into the methanol of an overlarge, resin was reprecipitated, rinsing desiccation was carried out, and resin was obtained.

[0055] To the 50g of the above-mentioned polyvinyl butyral resin, triethylene-glycol-di-2-ethyl-butyrate 15g, 0.10g of ultraviolet ray absorbents, and 0.10g of antioxidants were mixed as a plasticizer. This mixture was often kneaded with the 2 rolls heated by 80 degrees C, it formed in about 0.2mm in thickness, heating pressurization was carried out at 150 degrees C with the press which regulated this with the spacer, and the film (adhesive strength adjustment layer) with a thickness of 0.16mm was obtained. Then, this was adjusted so that water content might become 0.4 - 0.5% of the weight by the air conditioned room.

[0056] \*\* The preparation degree of polymerization 1700 of the substratum of the interlayer for glass laminates, and whenever [ saponification ], 99.2%, 0.0015g of adipic acids, 0.10g of ultraviolet ray absorbents, and 0.10g of antioxidants were blended with 50g of degree-of-acetalization 65-mol % of polyvinyl butyral resin as a plasticizer as triethylene-glycol-di-2-ethyl-butyrate 20g, 0.005g of magnesium acetate, and a dicarboxylic acid compound, and it mixed using the RAIKAI machine. This mixture was often kneaded with the 2 rolls heated by 80 degrees C, it formed in about 0.7mm in thickness, heating pressurization was carried out at 150 degrees C with the press which regulated this with the spacer, and the substratum of the interlayer for glass laminates with a thickness of 0.60mm was obtained.

[0057] \*\* Cut out the degree-of-acetalization % [ of the substratum of the interlayer obtained by a glass laminate carrying out production \*\*\*\*, and an adhesive strength adjustment layer / % of 85 mols ] polyvinyl-acetal film to 305mmx305mm. Between electrically conductive glass (thickness of 2.5mm) and float glasses (thickness of 2.5mm) with the glass of the same dimension / structure of ITO As the ITO layer of electrically conductive glass became inside, it put with the configuration (glass / ITO / degree-of-acetalization % of 85 mols) of the polyvinyl-acetal film (adhesive strength

adjustment layer) / interlayer substratum / glass, and it carried out preliminary adhesion with a roll. Subsequently, it was stuck by pressure by the pressure of 13kg/cm<sup>2</sup> with the 130-degree C autoclave, and the glass laminate was manufactured. About this glass laminate, the pan mel trial of UV irradiation before and the back was performed by the following approach. The result is shown in Table 2.

[0058] <Radiationproofing test> JIS According to the radiationproofing test of R3212, a glass laminate is put on the distance of 230mm from the quartz-glass mercury-vapor lamp of 750W, and it irradiates at 45 degrees C for 200 hours. The pan mel value of the glass laminate before and behind an exposure is evaluated.

[0059] <Panmel trial> 16 timing before an exposure and of the glass laminate after an exposure was carried out to -18-degree-C temperature of \*\*0.6 degrees C, and the hammer which has a 0.45kg head struck the center section (150mmx150mm part) of this glass laminate, it ground until the particle size of glass was set to 6mm or less, and whenever [ film after glass carries out partial avulsion exposure-] was judged with the pan mel value by Table 1.

[0060]

[Table 1]

中間膜の露出度 (%)	パンメル値
100	0
95	1
90	2
85	3
80	4
40	5
20	6
10	7
5	8
2	9
0	10

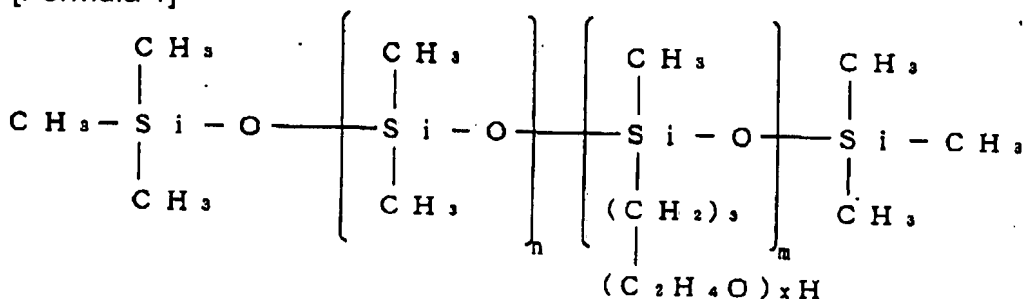
[0061] In this invention, the range of a pan mel value is 3-8, and moreover, since penetration-proof and the scattering tightness of glass are excellent, the small glass laminate of a difference is desirable by both sides. Adhesive strength becomes [ a pan mel value ] low less than by three, and the scattering tightness by an impact etc. falls. On the contrary, if a pan mel value exceeds 8, adhesive strength will become high, and the penetration-proof of the glass laminate by an impact etc. falls.

[0062] Changing the "example 2" n-butyraldehyde charge, other processes obtained degree-of-acetalization % of the polyvinyl butyral resin of 88 mols like the example 1. It prepared so that triethylene glycol 2-G ethyl butyrate 12.5g, 0.10g of ultraviolet ray absorbents, and 0.10g of antioxidants might be mixed to 50g of this polyvinyl butyral resin as a plasticizer, a 0.16mm interlayer might be obtained to it like an example 1 and

[0063] In this way, the degree of acetalization of the obtained adhesive strength adjustment layer judged the 88-mol polyvinyl-acetal film it is [ film ] %, and an interlayer substratum to 305mmx305mm, and between electrically conductive glass (thickness of 2.5mm) and float glasses (thickness of 2.5mm) with the structure of the glass/ZnO/Ag/ZnO of the same dimension, as the ZnO layer of electrically conductive glass became inside, the glass laminate was manufactured like the example 1. About this glass laminate, the pan mel trial of UV irradiation before and the back was performed. The result is shown in Table 2.

[0065] In this way, the degree of acetalization of the obtained adhesive strength adjustment layer judged the 90-mol polyvinyl-acetal film it is [ film ] %, and the substratum of an interlayer to 305mmx305mm, and between electrically conductive glass (thickness of 2.5mm) and float glasses (thickness of 2.5mm) with the glass of the same dimension / structure of ITO, as the ITO layer of electrically conductive glass became inside, the glass laminate was manufactured like the example 1. About this glass laminate, the pan mel trial of UV irradiation before and the back was performed. The result is shown in Table 2.

[Formula 1]



[0067] As "example 1 of comparison" polyvinyl-acetal resin, polyether denaturation silicone oil 0.0125g and 0.016g of magnesium acetate expressed with triethylene-glycol-

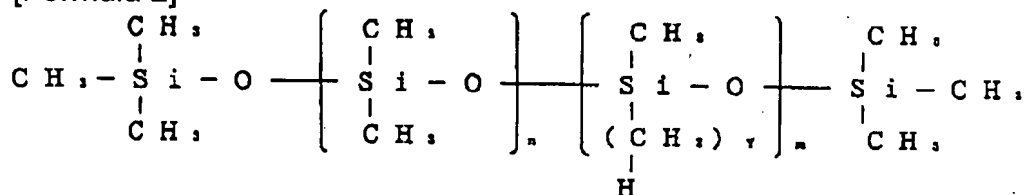
di-2-ethyl-butyrates 20g, 0.10g of ultraviolet ray absorbers, 0.10g of antioxidants, and said chemical formula "\*\*\* 1" as a plasticizer by 50g of 99% of polyvinyl butyral resin were mixed whenever [ degree-of-polymerization 1700, and degree-of-acetalization % and saponification ]. [ of 65 mols ] This mixture was often kneaded with the 2 rolls heated by 80 degrees C, it formed in about 0.8mm in thickness, heating pressurization was carried out at 150 degrees C with the press which regulated this with the spacer, and the interlayer with a thickness of 0.76mm was obtained.

[0068] This interlayer for glass laminates was judged to 305mmx305mm, as the ITO layer of electrically conductive glass came between electrically conductive glass (thickness of 2.5mm) and float glasses (thickness of 2.5mm) with the glass of the same dimension / structure of ITO, it carried out the laminating inside between, and preliminary adhesion was carried out with a roll. Subsequently, it was stuck by pressure by the pressure of 13kg/cm<sup>2</sup> with the 130-degree C autoclave, and the glass laminate was manufactured. About this glass laminate, the pan mel trial of UV irradiation before and the back was performed. The result is shown in Table 2.

[0069] The glass laminate was produced like the example 1 of a comparison except having used the alkyl group denaturation silicone oil expressed with the following chemical formula "\*\*\* 2" instead of the polyether denaturation silicone oil in the example 1 of the "example 2 of comparison" comparison. About this glass laminate, the pan mel trial of UV irradiation before and the back was performed. The result is shown in Table 2.

[0070]

[Formula 2]



[0071]

[Table 2]

	パ ン メ ル 値			
	紫 外 線 照 射 前		紫 外 線 照 射 後	
	熱線反射面側	ガラス板面側	熱線反射面側	ガラス板面側
実施例 1	7.5	7.5	6.5	6.5
実施例 2	6	6	5	5
実施例 3	5	5	4	4
比較例 1	7	6.5	3	5.5
比較例 2	6.5	6	2.5	5

[0072]

[Table 3]

	熱線反射面側 (金屬酸化物層か 金屬層)	ガ ラ ス 側			
	アセタール化度 (可塑劑量)	酢酸 マグネシウム	セバシン酸	アジピン酸	変性 シリコンオイル
実施例 1	85 (30)	0.01		0.003	
実施例 2	88 (25)	0.01	0.005		
実施例 3	90 (18)	0.01	0.005		0.025
比較例 1	65 (40)	0.032			0.025
比較例 2	65 (40)	0.032			0.025

The data of the interlayer for glass laminates obtained in an above-mentioned example and the above-mentioned example of a comparison are shown in Table 3.

About the example of a comparison of notes front Naka, an interlayer is 1 lamination, and it uses for one of them. The presentation of a resin constituent is shown in the table.

[0073]

[Effect of the Invention] Highly efficient nature, such as heat ray reflexivity, is given by a metal oxide layer or the metal layer, and, as for the interlayer for glass laminates and glass laminate of this invention, the adhesive strength adjustment layer in which especially the degree of acetalization is formed from the resin constituent which considers as a principal component in the polyvinyl-acetal resin in 80-95-mol the range in which it is % has the metal oxide layer or the metal layer front face, and the moderate adhesive property.

[0074] Moreover, it is adjusted moderately, without the substratum formed from the resin constituent with which the degree of acetalization consists of the polyvinyl-acetal resin in 60-75-mol the range which is %, a plasticizer, a carboxylic-acid metal salt, and a dicarboxylic acid compound showing a moderate adhesive property in respect of glass, and producing a big difference in adhesive strength in respect of [ of an interlayer ] each, and the fall of the adhesive strength in the passage of time by the outdoor exposure, UV irradiation, and temperature is prevented.

[0075] Therefore, according to this invention, it excels in penetration-proof and the scattering tightness of glass over a long period of time, the glass laminate which has high efficiency, such as heat ray reflexivity, can be obtained, and this glass laminate is used suitable for windowpanes, such as an automobile, an aircraft, and a building.

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[Translation done.]